



ANITA WANLESS

HAFNIUM

Element Symbol: **Hf**

Atomic Number: **72**

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Hafnium was first discovered in Copenhagen and was named after the Latin name for the city – Hafnia.

Hafnium is a very ductile metal with a brilliant silver lustre. It was predicted to be found in zirconium minerals by Dmitri Mendeleev in 1869. It was discovered in 1923 by D. Coster and G. von Hevesey in zircon using XRF Spectroscopy. Zirconium minerals contain between 1 – 5% Hafnium. Zirconium and Hafnium have very similar properties and are very difficult to separate. Most Hafnium metal is produced today by using the Kroll Process – by reducing Hafnium tetrachloride with magnesium or sodium, in order to produce pure Zirconium.

Hafnium is twice as dense as Zirconium and has excellent mechanical properties and is extremely corrosion resistant. It reacts in air to form a protective film, making it resistant to attack by acids or alkalis.

Hafnium makes the most refractory carbide and nitrides of any known metal. Hafnium nitride has a melting point of 3310°C. Hafnium carbide has a melting point of 3890°C. It can be oxidised by halogens and burnt in air. When finely divided, Hafnium is pyrophoric and can ignite spontaneously in air. Hafnium is used in reactor rods in nuclear reactors and nuclear submarines.

Hafnium has been used in alloys with many metals. A Hafnium alloy, C-103, which is 89% niobium, 10% Hafnium and 1% titanium was used in the main engine of the Apollo Lunar Modules.

Hafnium isotopes are being studied for the possibility of using it as a power source for gamma-ray lasers or unmanned aircraft.

Hafnium is a good oxygen and nitrogen scavenger and has been used in gas filled and incandescent lamps.

Hafnium is found with zirconium sources, and is therefore a by-product of mineral sands deposits. Sources containing Hafnium are found in Brazil, Malawi and Australia – Mount Weld in Western Australia is considered to be one of the richest rare earth deposits in the world.

Provided by the element sponsor Sharon McEvoy

ARTISTS DESCRIPTION

Hafnium is the element used to control nuclear reactions, in modern nuclear power plants. The artist wanted to show its moderating qualities through the use of an obedient dog on a leash - dog being man's best friend and is a symbol of trustworthiness that a broad audience can associate with.

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